Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Original) A method of pattern recognition, said method comprising the steps of:

a first step for finding feature-extraction-matrix AF of pattern set A1 and feature-extraction-matrix BF of pattern set B1, said matrices AF, BF maximizing between-class scatter and minimizing within-class scatter with respect to training pattern sets A1, B1 respectively, which are sets of pair of patterns obtained from a same object but on different conditions;

a second step for calculating feature-amount fB1i using the feature-extracting-matrix BF with respect to typical pattern B1i of respective classes "i" of the training pattern set B1;

a third step for retaining a set {fB1i} of the feature amount fB1i and the matrices AF, BF in a referential database; and

a fourth step for determining an element, among the feature amount fB1i retained in the referential database, most similar to a feature amount fA2j extracted from the matrix AF applied to input pattern A2j.

2. (Original) The method of pattern recognition of claim 1, wherein the feature-extraction-matrices AF, BF are calculated through the steps of:

estimating between-class scatters Ca – b, Cb – b of the pattern sets A1, B1 and within-class scatter Ca – w of the pattern set A1 from the training pattern sets A1, B1;

calculating within-class scatter Cab – w and between-class scatter Cab – b, both extending over the pattern sets A1, B1, based on a set of pair of elements corresponding to the pattern sets A1, B1; and

calculating a feature-extraction-function which maximizes Ca – b, Cb – b, and Cab – b out of the five statistical amounts, i.e., Ca – b, Cb – b, Ca – w, Cab – w, Cab – b, and minimizes Ca – w, Cab – w.

3. (Original) The method of pattern recognition of claim 1, wherein the pattern set A1 is obtained through shooting an object with a video camera, and the pattern set B1 is obtained through taking an object with an image scanner.

4. (Original) The method of pattern recognition of claim 1, wherein the steps 1, 2 and 3 are done in off-line process and the step 4 is done in on-line process.

5. (Original) The method of pattern recognition of claim 3, wherein the pattern set A1 is formed by a plurality of images with respect to one object, and the pattern set B1 is formed by a single photo with respect to one object.

6. (Original) A method of pattern check, said method comprising the steps of:

a first step for finding feature-extraction-matrix AF of pattern set A1 and feature-extraction-matrix BF of pattern set B1, said matrices AF, BF maximizing between-class scatter and minimizing within-class scatter with respect to the training pattern sets A1, B1 which are sets of pair of patterns obtained from a same object but on different conditions;

a second step for calculating feature amounts "fa", "fb" of input patterns "a", "b" using the matrices AF, BF; and

a third step for determining whether or not the input patterns "a", "b" derive from a same class based on similarity measure of the feature amounts "fa", "fb".

7. (Original) The method of pattern check of claim 6, wherein the feature-extraction-matrices AF, BF are calculated through the steps of:

estimating between-class scatters Ca – b, Cb – b of the pattern sets A1, B1, which are sets of patterns obtained on different conditions, and within-class scatters Ca – w, Cb – w of the pattern sets A1, B1;

calculating within-class scatter Cab – w and between-class scatter Cab – b, both extending over the pattern sets A1, B1, based on a set of pair of elements corresponding to the pattern sets A1, B1; and

calculating a feature-extraction-function which maximizes Ca – b, Cb – b, and Cab – b out of the six statistical amounts, i.e., Ca – b, Cb – b, Ca – w, Cb – w, Cab – w, Cab – b, and minimizes Ca – w, Cb – w, Cab – w.

8. (Original) The method of pattern recognition of claim 6, wherein the pattern set A1 is obtained through shooting an object with a video camera, and the pattern set B1 is obtained through taking an object with an image scanner.

9. (Original) The method of pattern recognition of claim 6, wherein the first step is done in off-line process and the second and third steps are done in on-line process.

10. (Original) The method of pattern recognition of claim 8, wherein the pattern set A1 is formed by a plurality of images with respect to one object, and the pattern set B1 is formed by a single photo with respect to one object.

11. (Original) A pattern recognition apparatus comprising:

(a) pattern input means for obtaining training-pattern-sets A1, B1, which are sets of pair of patterns, from a same object but on different conditions;

(b) a feature-extraction-matrix generating unit for finding feature-extraction-matrix AF of the pattern set A1 and feature-extraction-matrix BF of the pattern set B1, both matrices AF, BF maximizing between-class scatter and minimizing within-class scatter with respect to the pattern sets A1, B1;

(c) a feature-amount calculating unit for calculating a feature amount fB1i using the feature-extraction-matrix BF with respect to typical pattern B1i of each class "i" of the training pattern set B1;

(d) transfer means for transferring a set {fB1i} of the feature amount fB1i and the feature-extraction-matrix BF to referential database FB1; and

(e) optimum matching determination means for selecting an element most similar to feature amount fA2j from the database by applying the feature-extraction-matrix AF to pattern A2j input, the feature amount fA2j being extracted after applying the matrix AF to the pattern A2j.

12. (Original) The pattern recognition apparatus of claim 11, wherein said feature-extraction-matrix generating unit including:

(b-1) an estimating unit for estimating between-class scatters Ca – b, Cb – b in the pattern sets and within-class scatter Ca – w of the pattern set A1 from the pattern sets A1, B1;

(b-2) a scatter calculating unit for calculating within-class scatter Cab – w and between-class scatter Cab – b, both scatters extending over the pattern sets A1, B1, from sets of a pair of elements corresponding to the pattern sets A1, B1; and

(b-3) a feature-extracting-function unit for calculating a feature-extracting-function which maximizes Ca – b, Cb – b, Cab – b out of five statistical amounts, i.e., Ca – b, Cb – b, Ca – w, Cab – w, Cab – b, and minimizes Ca – w, Cab – w.

13. (Original) The pattern recognition apparatus of claim 11, wherein the pattern set A1 is obtained through shooting an object with a video camera, and the pattern set B1 is obtained through taking an object with an image scanner.

14. (Original) The pattern recognition apparatus of claim 13, wherein the pattern set A1 is formed by a plurality of images with respect to one object, and the pattern set B1 is formed by a single photo with respect to one object.

15. (Original) A pattern check apparatus comprising:

(a) a pattern inputting unit for obtaining training pattern sets A1, B1, which are sets of pair of patterns, from a same object but on different conditions;

(b) a feature-extraction-matrix generating unit for finding feature-extraction-matrix AF of the pattern set A1 and feature-extraction-matrix BF of the pattern set B1, both matrices AF, BF maximizing between-class scatter and minimizing within-class scatter with respect to the pattern sets A1, B1;

(c) a feature-extracting-unit for calculating respective feature amounts "fa", "fb" using the feature-extracting-matrices AF, BF from input pattern "a", "b" supplied from said pattern input unit;

(d) an identity determination unit for determine whether or not the input patterns "a", "b" are derived from the same class based on similarity measure of the feature amounts "fa", "fb".

16. (Original) The pattern check apparatus of claim 15, wherein said feature-extraction-matrix generating unit including:

(b-1) an estimating unit for estimating between-class scatters Ca – b, Cb – b and within-class scatter Ca – w, Cb – w from the pattern sets A1, B1 respectively;

(b-2) a scatter calculating unit for calculating within-class scatter Cab – w and between-class scatter Cab – b, both scatters extending over the pattern sets A1, B1, from sets of a pair of elements corresponding to the pattern sets A1, B1; and

(b-3) a feature-extracting-function unit for calculating a feature-extracting-function which maximizes Ca – b, Cb – b, Cab – b out of six statistical amounts, i.e., Ca – b, Cb – b, Ca – w, Cb – w, Cab – w, Cab – b, and minimizes Ca – w, Cab – w, Cab – w.

17. (Original) The pattern check apparatus of claim 15, wherein the pattern set A1 is obtained through shooting an object with a video camera, and the pattern set B1 is obtained through taking an object with an image scanner.

18. (Original) The pattern check apparatus of claim 17, wherein the pattern set A1 is formed by a plurality of images with respect to one object, and the pattern set B1 is formed by a single photo with respect to one object.

19. (Original) A recording medium which records a program of recognizing a pattern by a computer, said program carrying out the processes of:

(a) a process for finding feature-extraction-matrix AF of pattern set A1 and feature-extraction-matrix BF of pattern set B1, said matrices AF, BF maximizing between-class scatter and minimizing within-class scatter with respect to the training

pattern sets A1, B1 which are sets of pair of patterns obtained from a same object but on different conditions;

(b) a process for calculating feature amount "fB1i" using the feature-extracting-matrix BF with respect to typical pattern "B1i" of respective classes "i" of the training pattern set B1;

(c) a process for retaining a set {fB1i} of the feature amount fB1i and the matrices AF, BF in a referential database; and

(d) a process for determining an element, among the feature amount fB1i retained in the referential database, most similar to a feature amount fA2j extracted from the matrix AF applied to input pattern A2j.

20. (Original) A recording medium which records a program of checking a pattern by a computer, said program carrying out the processes of:

(a) a process for finding feature-extraction-matrix AF of pattern set A1 and feature-extraction-matrix BF of pattern set B1, the matrices AF, BF maximizing between-class scatter and minimizing within-class scatter with respect to the training pattern sets A1, B1 which are sets of pair of patterns obtained from a same object but on different conditions;

(b) a process for calculating feature amounts "fa", "fb" of input patterns "a", "b" using the matrices AF, BF; and

(c) a process for determining whether or not the input patterns "a", "b" derive from a same class based on similarity measure of the feature amounts "fa", "fb".

21. (New) A method of pattern recognition according to claim 1, wherein said between-class scatter is for different objects in said pattern sets, respectively.

22. (New) A method of pattern check according to claim 6, wherein said between-class scatter is for different objects in said pattern sets, respectively.

23. (New) A pattern recognition apparatus according to claim 11, wherein said between class scatter is for different objects in said pattern sets, respectively.

24. (New) A pattern check apparatus according to claim 15, wherein said between-class scatter is for different objects in said pattern sets, respectively.

25. (New) A recording medium according to claim 19, wherein said between-class scatter is for different objects in said sets, respectively.

26. (New) A recording medium according to claim 20, wherein said between-class scatter is for different objects in said sets, respectively.